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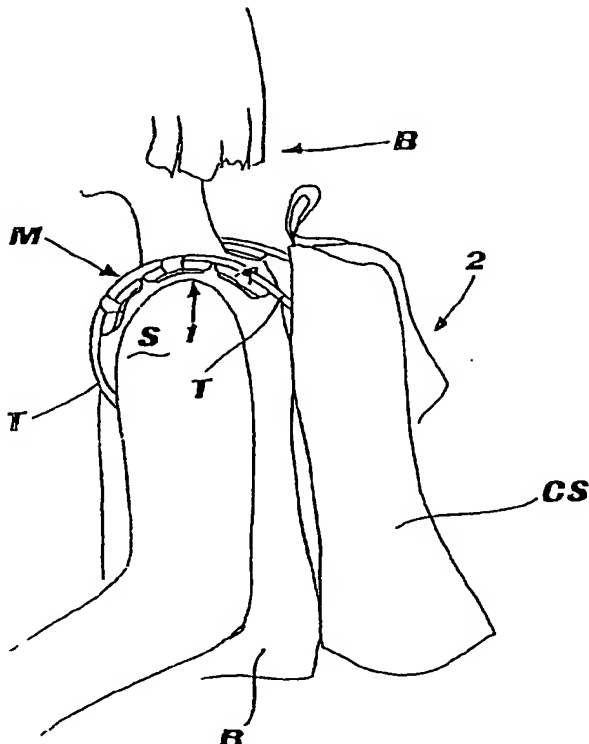
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: A BACKPACK ATTACHMENT FOR IMPROVED DISTRIBUTION OF THE BACKPACK WEIGHT ACROSS A USER'S SHOULDERS



(57) Abstract: A backpack attachment is provided for use with backpacks that have a bag-like body and a pair of shoulder straps, in particular backpacks used by school attendants, which is effective to distribute the backpack weight in a rationalized fashion across a user's shoulders. The attachment comprises essentially two curved members (1) arranged to stiffen substantially the sections of the shoulder straps (T) that lie closest to the upper region of the bag-like body (CS). These members may replace or be associated with said sections of the shoulder straps (T), and consist of a pair of substantially inflexible curved members being each a one-piece construction (2, 2A), or consist of several pieces (6, 11) jointed to one another. In a preferred embodiment, the attachment comprises a pair of members formed each of several pieces (11) which can be associated detachably to the shoulder straps (T), at least one (14) of them in a locked fashion.

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**"A backpack attachment for improved distribution of the backpack weight across a user's shoulders"**

DESCRIPTION

Field of Application

5 The present invention relates to a backpack specially intended for use by schoolchildren, whereby the combined weight of the backpack and its contents is distributed across the user's shoulders in a rationalized fashion to prevent the assumption of undesirable bodily attitudes apt to cause discomfort, pain, and eventually lead to muscular and skeletal  
10 deformities particularly among young users.

It should be recognized that, in carrying across their backs any of the school backpacks that are currently available in a variety of designs, school boys and girls tend to assume potentially harmful bodily attitudes in an attempt to counteract the natural tendency of the  
15 backpacks, when loaded with heavy text- and note-books, to pull down on the pair of pliant canvas or leather straps that are passed over their shoulders. They also tend to enter a leaning attitude in order to resist the pressure of the shoulder straps against their torso front. Either reaction of the young user ends up in a forward leaning attitude being  
20 assumed to balance the backpack weight, which is the more tiresome and may ultimately strain his/her bone structure (particularly the spine) and muscles.

All this has harmful effects especially on young people in their growth period.

25 The situation may be less serious in its consequences, but is still objectionable, with other users of backpacks, e.g. ladies using small backpacks in preference to handbags and loading them with fairly heavy items, or sportsmen/women who may wish to carry things along in a backpack when going out for a hiking, cycling, or cross-country  
30 skiing spell.

This invention is directed to remedy the above-outlined situation by providing a backpack attachment, whereby the backpack weight is better distributed across the user's shoulders and the user is relieved of the constraint to lean unnaturally under the backpack weight. In addition, this attachment makes a heavily loaded backpack more convenient to carry for a given effort.

These objects are achieved, according to the invention, by an attachment for backpacks comprised of a bag-like body and a pair of shoulder straps, in particular school attendant's backpacks, being characterized by two curved members effective to stiffen substantially the shoulder strap sections that lie closest to the top of the bag-like body. The curved members are preferably substantially inflexible parts mounted either in place of the shoulder strap section (T) that lies closest to the top of the bag-like body (CS), or otherwise associated with said section.

These substantially inflexible curved members have their undersides lined with a soft yielding material for improved user's comfort.

In a first embodiment, the attachment of the invention comprises a pair of substantially inflexible curved members, each a one-piece construction. These members may have a hollow interior for slipping over said shoulder straps, or may have one end hinge-connected to a holder, which can be fixed on the upper region of the bag-like body of the backpack, and the other end connected to the shoulder straps.

In a second embodiment, the attachment of the invention comprises a pair of substantially inflexible curved members which are formed of several pieces jointed together. These members may comprise hollow pieces adapted to be slipped over the shoulder strap, or the leading one of the jointed hollow pieces may be attached to the top of the bag-like body of the backpack and the trailing one to the shoulder strap. Alternatively, the leading one of the jointed pieces of each member may be attached to the top of the bag-like body of the backpack, and the shoulder strap may extend from said leading piece through the other pieces.

In a third embodiment, being a preferred modification of the second, the attachment of the invention comprises members that are each formed of several, preferably shaped pieces adapted to engage releasably with a shoulder strap, at least one of them being affixed to the strap. The former pieces of said members may be engaged with the shoulder straps by means of releasable hoops, whereas the latter pieces are engaged by means of a releasable camlock device. Preferably, this attachment version includes arrangements for locking the jointed pieces of each member into a set angle to one another. The angular position of the jointed pieces of each member is thus made adjustable. Preferably, the locking device is mounted on one side of the individual jointed pieces, and comprises a gear wheel and a lockable spring-biased slider having an end jaw for engagement with the teeth of the adjacent piece wheel.

The invention will be explained in further detail here below, in relation to currently preferred ones of its very many viable embodiments and with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of one of two attachment members in a first embodiment of the invention;

Figure 2 is a view, similar to Figure 1, of one of the two attachment members in a second embodiment of the invention;

Figures 3 and 4 show two modifications of the embodiments of the invention shown in Figures 1 and 2, respectively;

Figure 5 is another modification of the embodiment of the invention shown in Figure 2;

Figure 6 shows a third embodiment of the invention, of enhanced practical value;

Figures 7 and 8 are two detail views, taken at 90 degrees from each other, of the attachment shown in Figure 6;

Figure 9 is a perspective view illustrating the way that the attachment of Figure 1 is applied to an ordinary backpack;

Figure 10 is a perspective view illustrating the way that the attachment of Figures 6 and 8 is applied to an ordinary backpack; and

Figure 11 shows a backpack, incorporating the attachment of the invention, as carried by a girl on her back.

5 With reference to the drawings, the object of the invention is best illustrated by Figure 11 showing the enhanced set of a backpack according to the invention, and the improved bodily attitude of a girl B carrying on her back a backpack Z which is equipped with the stiff curved members forming the attachment M of this invention. Such  
10 curved members can replace or be associated with the sections of shoulder straps T that lie closest to the upper region of the bag-like body CS of the backpack Z.

It can be appreciated from Figure 11 that the stiffened upper section of  
15 the shoulder strap T adjacent to the bag-like body CS transfers the backpack weight directly onto the user's shoulders S, such that the user has less difficulty to maintain a straight-up attitude - which becomes the most suitable position for carrying the backpack - and is no longer coerced into a forward leaning attitude that is at the root of  
20 the aforementioned spine problems.

As said before, the invention can be variously embodied, some such embodiments being described herein below.

In a first embodiment of the inventive attachment, shown in Figures 1 and 3, a pair of substantially inflexible curved members 1 are formed of  
25 one piece each.

In the embodiment of Figure 1, the members 1 comprise hollow curved pieces 2 of wood, metal, or plastics, which are adapted to be slipped over each shoulder straps T of a commercially available backpack, as shown in Figure 8, to contact the top rear wall of the bag-like body S of  
30 the backpack Z. The underside of the hollow pieces 2 is lined with a soft yielding material for more comfortable contact with the user's shoulder.

In the embodiment of Figure 3, the curved members 1 again comprise curved pieces 2A of wood, metal, or plastics, but need not be of hollow construction. These pieces are hinge-connected to holders 4 that can be secured in areas where the shoulder straps are usually hung. This design is especially suitable for the manufacture of new backpacks, whereas it is not adapted for modifying according to the invention those backpacks which have already been manufactured. It requires, in fact, that the affected areas of the bag-like body wall be provided, by means of any appropriate mechanical means, with holders 4, in order for them to get stiffened. The stiffening effect can be obtained in any of several ways, e.g. by providing additional metal or plastics plates or by providing the bag-like body CS of the backpack Z with a rigid or semirigid material wall to which the shoulder straps T can be connected. The shoulder straps are made fast here to the end of the piece 2A away from the holder 4. The angled set of the pieces 2A relative to the holders 4 can be adjusted and maintained by a device, not shown, in order to tailor the backpack attachment to fit a user's anatomy.

In a second embodiment of the backpack attachment of this invention, shown in Figures 2, 4 and 5, a pair of substantially inflexible curved members 1 are used which comprise several pieces jointed to one another. These members 1 may comprise hollow pieces 5 adapted to be slipped over the shoulder straps of the backpack as shown in Figure 2. Alternatively, as shown in Figure 4, the leading one 7 of the hinge-connected pieces 6 in each member 1 is affixed to a stiffened area at the top of the bag-like body CS of the backpack Z, with the shoulder strap fastened to the trailing one 8 of said pieces 6. In a modification shown in Figure 5, the leading one 9 of said hinge-connected pieces 6 in each member 1 is provided much longer than the others for more secure connection to the wall of the bag-like body CS of the backpack Z, and the shoulder strap 10 extends from the leading piece 9 through all the others 6, it being connected to such pieces in a suitable manner to produce the curved pattern of the member 1 shown in Figure 5.

In a third embodiment, which may be regarded as a presently preferred

modification of the second, the invention is embodied most effectively by the backpack attachment having (Figures 6 to 8) two members 1, each comprised of several stiff shaped pieces 11 of relatively small thickness adapted to be associated with the backpack shoulder straps in a detachable fashion. Some of the pieces 11 are loosely associated with a respective one of the shoulder straps (not shown in Figures 6 to 8) by releasable hoops formed by a pair of strips 12 which are Velcro tipped at 13 to engage with each other over the shoulder strap. At least one 14 of these pieces should incorporate a releasable locking device. Figure 6 shows this locking device as comprised of an L-shaped camming lever 15 pivoted about a pin 16 in side retainers 17 of open construction. Once the shoulder strap is threaded through the piece 14 and under the camming lever 15, the camming lever can be operated between a position where the member 1 is allowed to run along the shoulder strap and a position where the member 1 is cammed down against the shoulder strap, a suitable distance away from the bag-like body CS of the backpack Z to fit the user's anatomy. The pieces 11, 14 of these members 1 have their undersides lined with a soft yielding material 18 for more comfortable contact with the user's body (as basically favored by the shape of the pieces 11).

Preferably, in the embodiment just described, a positive engagement means (Figures 7 and 8) is arranged on the individual hinge-connected pieces for locking them in selected mutually angled positions, thereby to further a close fit of the attachment to a user's anatomy and/or meet a user's preference. To set the hinge-connected pieces 11 and/or 14 to a desired included angle, locking devices are provided on one side of said pieces, according to the preferred embodiment of Figure 7, which devices comprise a small gear wheel 19 and a slider 20. The gear wheel 19 locates next to one end of the side of the piece, 11 and/or 14, and the slider 20 is moved along this side. The slider 20 is formed at one end with a jaw 21 for engagement with teeth of the gear wheel 19 on the adjacent piece, 11 or 14, and is biased away from the latter by a spring 11 mounted on the other end of the slider. After a desired included angle between two pieces 11 and/or 14 is found, the slider 20 of one piece is shifted against the bias of the spring 14 to engage the gear

wheel 19 on the other piece, thereby locking both pieces together in their set positions. To maintain an angled relationship between the two pieces 11 and/or 14, the slider 20 is locked in the engaged position with the wheel 19 by driving a knurled end 25 of a tapered pin 23 through a mating hole in the slider 20. To change a setting, the pin 23 is released and the spring 22 allowed to urge the slider 20 out of engagement by its jaw 21 with the gear wheel 19. A retainer 26 has a shank slidable along a slot 27 to hold the slider 20 close against the side of the piece 11.

The advantageous backpack attachment described above with reference to Figures 6 to 8 can retrofit all types of commercially available backpacks, as well as be applied to backpacks of new manufacture, and is shown in Figure 10 in the act of being applied to a backpack Z.

A backpack Z incorporating the inventive attachment and being carried by a girl B is shown in Figure 11.

It is thus deemed that the invention has been adequately described, although it may be embodied in a number of different forms, all within the scope of this proprietorship. The invention does achieve its object of better distributing the weight of a backpack across the user's shoulders, thereby correcting a prior tendency to assume a leaning attitude under the backpack weight that can harm young users in their growth period. Additionally, the inventive backpack attachment makes the backpack easier and more comfortable to use by that it can be carried more efficiently, even when loaded with contents that may be unusually heavy.

Moreover, the attachment according to the present invention can also advantageously be used not only to prevent harm to young users by eliminating the tendency to assume a leaning attitude under the backpack weight, but also to correct already established forms of scoliosis, lordosis, kyphosis and other abnormal curvatures of the spine.

This can be achieved by suitably positioning the substantially inflexible curved members over the user's shoulders so that the weight of the



backpack, which is in turn appropriately calibrated, is preferably addressed in such a direction to counteract the abnormal curvature (e.g. it should preferably be directed backwards in order to correct a form of lordosis).

- 5 It is also possible to operate further corrections by adjusting the rigidity of the various sections of the shoulder straps, so as to make the latter totally rigid in certain sections and partially flexible or totally flexible in other sections.

## CLAIMS

1. A backpack attachment for use with backpacks that have a bag-like body (CS) and a pair of shoulder straps (T), in particular backpacks (Z) used by school attendants, being effective to distribute the backpack weight in a rationalized fashion across the user's shoulders, and characterized in that it comprises two curved members (1) arranged to stiffen substantially the sections of the shoulder straps (T) that lie closest to the upper region of the bag-like body (CS).
2. The attachment of Claim 1, comprising two substantially inflexible curved members mounted in place of the closest sections of the shoulder straps (T) to the upper region of the bag-like body (CS).
3. The attachment of Claim 1, comprising two substantially inflexible curved members associated with the closest sections of the shoulder straps (T) to the upper region of the bag-like body (CS).
4. The attachment of Claims 1 to 3, wherein said substantially inflexible curved members (1) have their underside lined with a soft yielding material (3).
5. The attachment of Claims 1 to 4, consisting of a pair of substantially inflexible curved members (1), each as a one-piece construction (2, 2A).
6. The attachment of Claims 1 to 4, comprising a pair of substantially inflexible curved members (1), wherein said curved members are made up of several pieces (6) jointed to one another.
7. The attachment of Claim 5, wherein said members (1) are of hollow construction and adapted to be slipped each over one of said shoulder straps (T).
8. The attachment of Claim 5, wherein said members (1) are hinge-connected to a holder (4), said holder being adapted to be affixed to the upper region of the bag-like body (CS) of the backpack (Z).

9. The attachment of Claim 6, having the members (1) made up of hollow pieces adapted to be slipped over said shoulder straps (T).

10. The attachment of Claim 6, wherein the leading one (7) of said hinge-connected pieces (6) in each member (1) can be affixed to the upper region of the bag-like body (CS) of the backpack (Z), with the trailing one carrying the shoulder strap (T) fastened thereto.

11. The attachment of Claim 6, wherein the leading one (9) of said hinge-connected pieces (6) in each member (1) can be affixed to the upper region of the bag-like body (CS) of the backpack (Z), with the shoulder strap (T) extending from said leading piece (9) through the other pieces (6) connected thereto.

12. The attachment of Claim 6, wherein the members (1) are made up of several shaped pieces (11), each adapted to be associated with the shoulder straps (T) in a detachable manner, at least one (14) in a lockable manner.

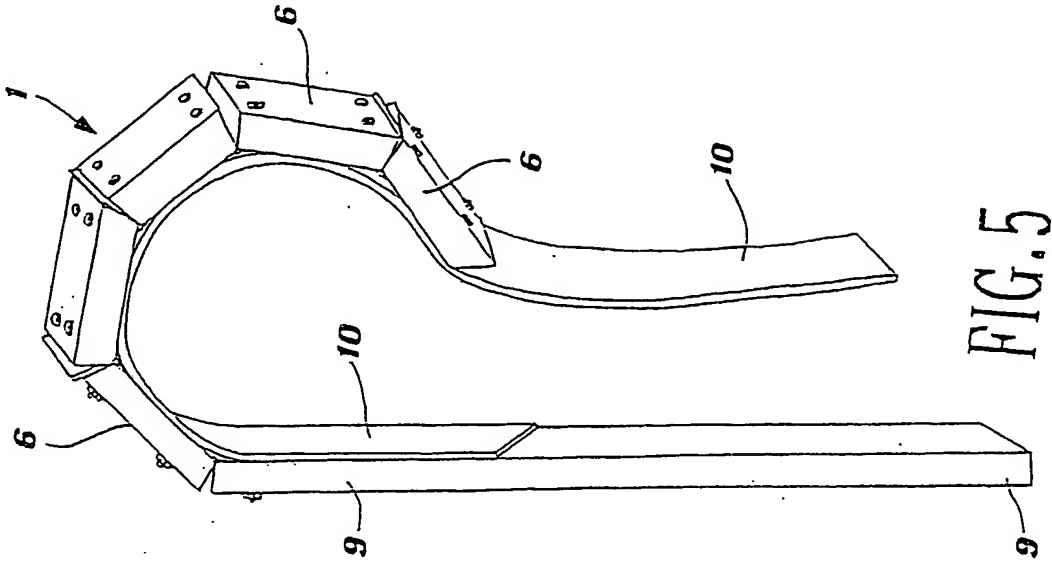
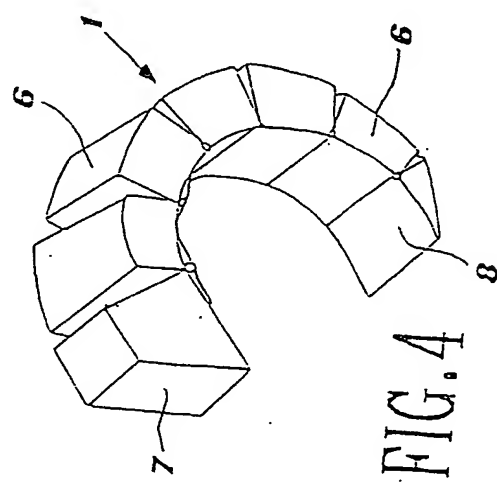
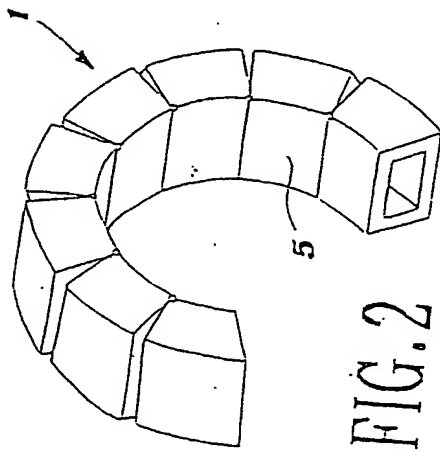
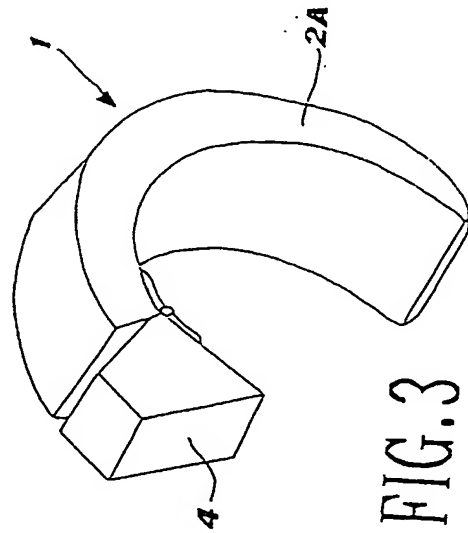
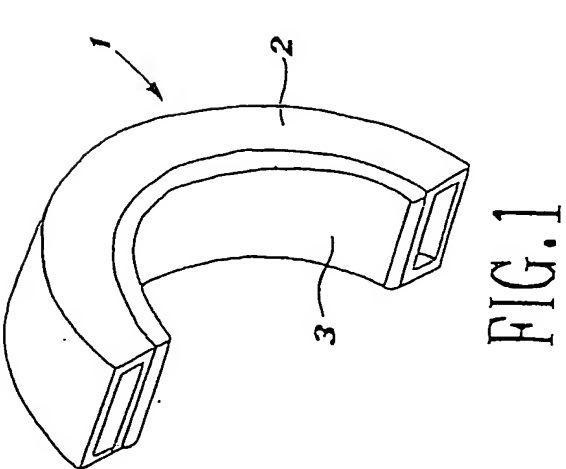
13. The attachment of Claim 12, wherein said leading pieces (11) of said members (1) can be associated with the shoulder straps by means of releasable hoops (12), the other piece (14) being associated with the shoulder straps by means of a releasable camlock device (15,16,17).

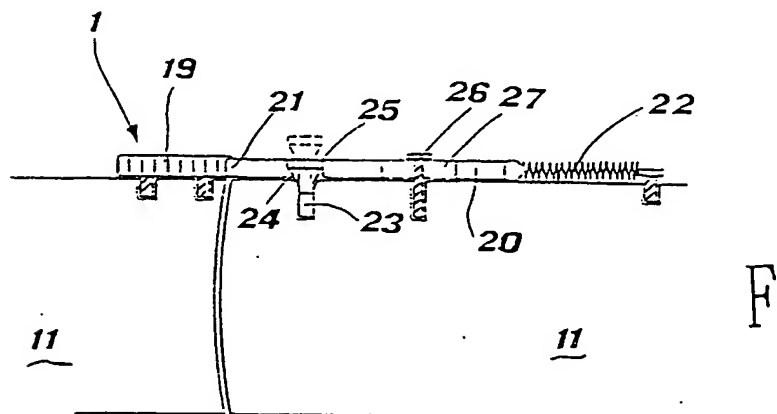
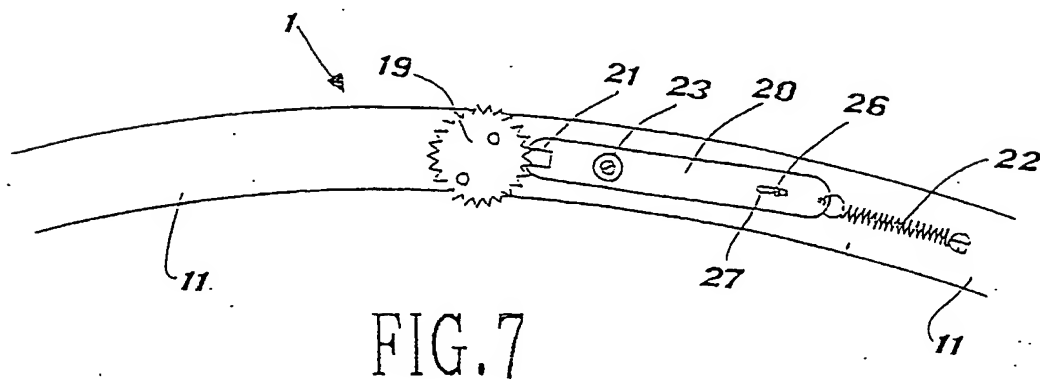
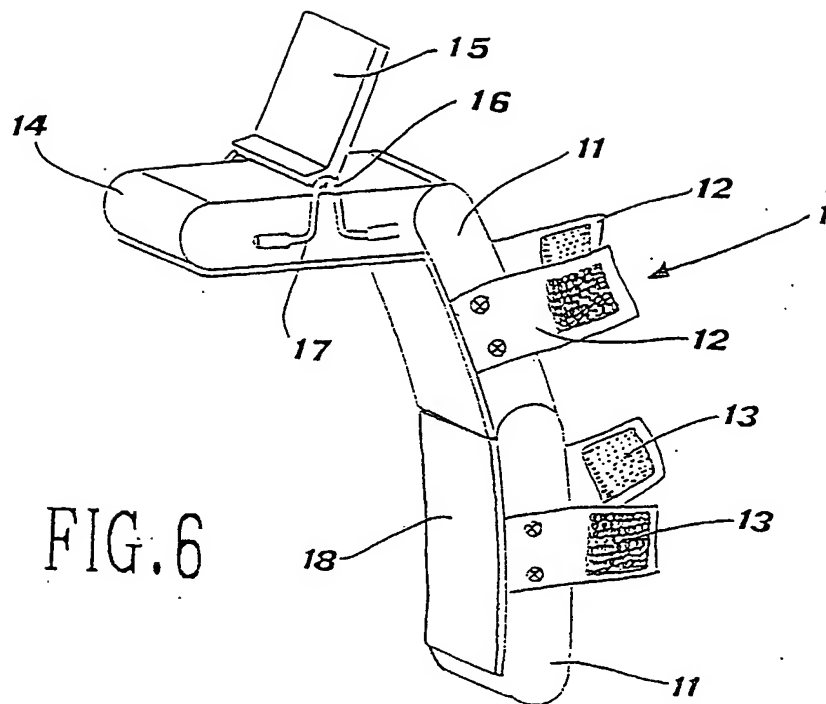
14. The attachment of Claim 12, wherein a locking arrangement (19,20) intervenes between the jointed pieces (11) of each member for maintaining a set angle between individual ones of said pieces.

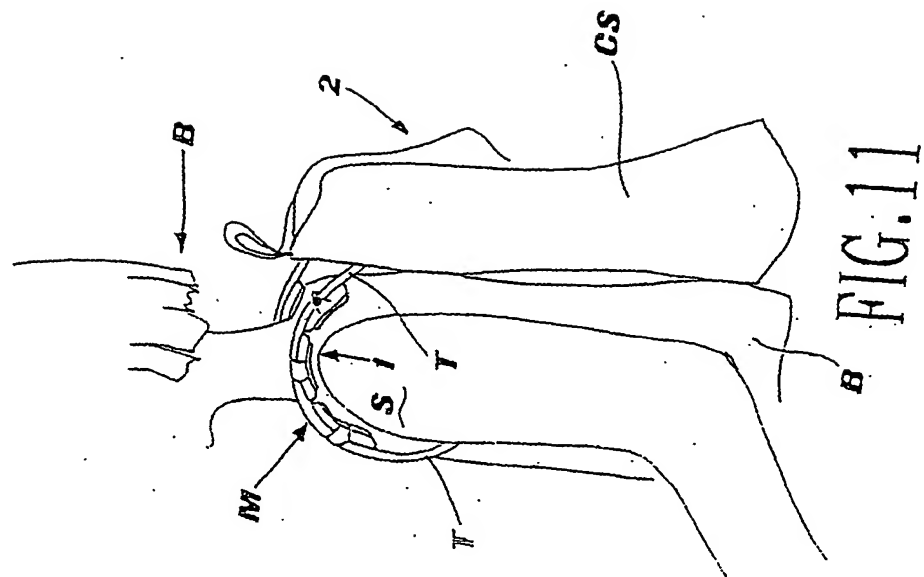
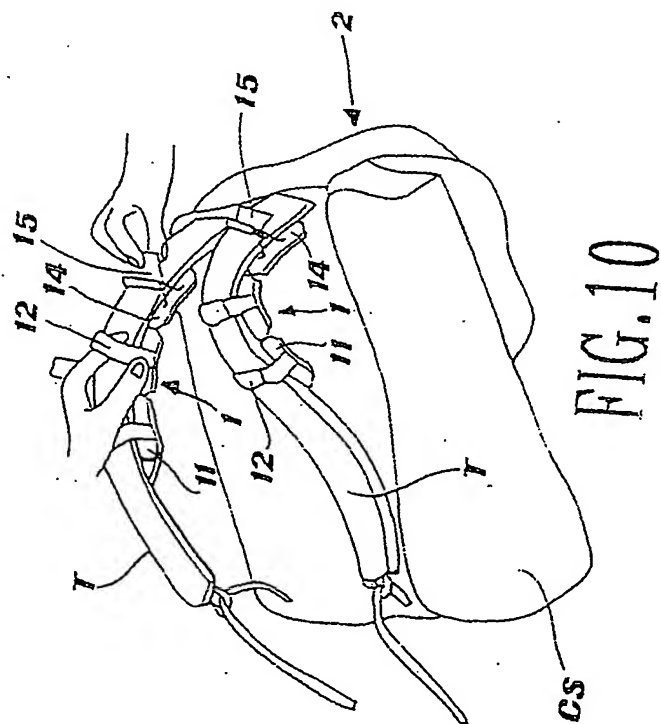
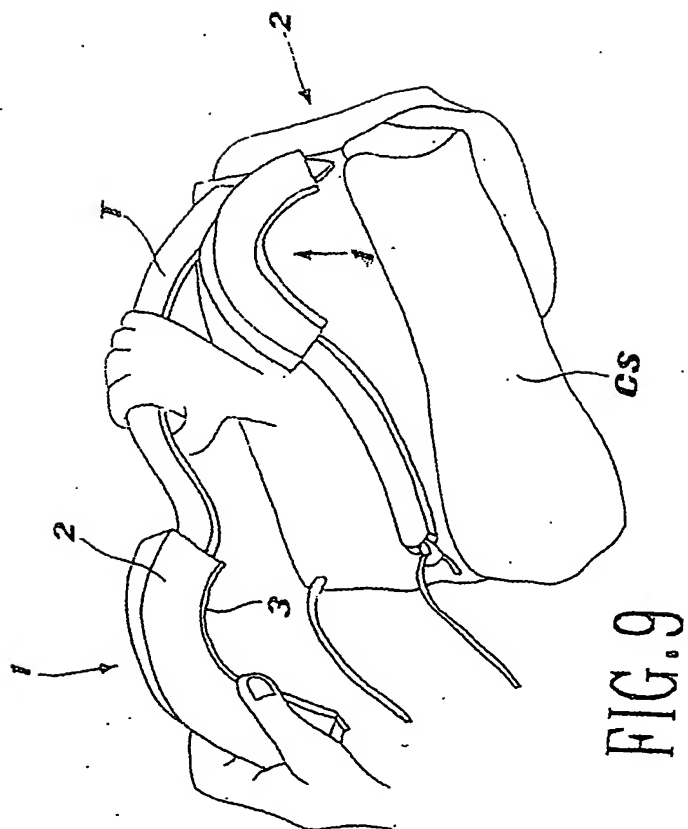
15. The attachment of Claims 12 and 13, wherein said set angle between individual jointed pieces (11) of each member (1) is adjustable.

16. The attachment of Claims 12 to 14, wherein said locking arrangement (19,20) comprises, mounted on one side of each said jointed pieces (11), a gear wheel (19) and a lockable spring-biased slider (20), said slider being formed with an end jaw (21) adapted to engage with teeth of a gear wheel (19) on the adjacent one of said pieces.

17. The attachment of any of the preceding Claims, for use in a method of correcting abnormal curvatures of the spine.







# INTERNATIONAL SEARCH REPORT

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**A. CLASSIFICATION OF SUBJECT MATTER**  
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According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Y	column 1, line 1 -column 16, line 57 ----	7,9
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A	US 5 599 286 A (LABELLE HUBERT ET AL) 4 February 1997 (1997-02-04) column 5, line 59 -column 9, line 58 -----	17

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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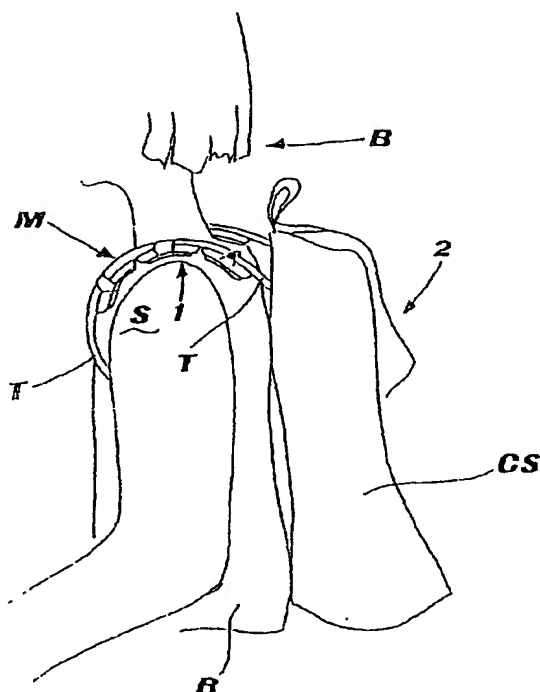
(72) Inventor: LA GRECA, Gaetano [IT/IT]; Via C. Battisti,  
37, I-20051 Limbiate (IT).

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(54) Title: A BACKPACK ATTACHMENT FOR IMPROVED DISTRIBUTION OF THE BACKPACK WEIGHT ACROSS A  
USER'S SHOULDERS



(57) Abstract: A backpack attachment is provided for use with backpacks that have a bag-like body and a pair of shoulder straps, in particular backpacks used by school attendants, which is effective to distribute the backpack weight in a rationalized fashion across a user's shoulders. The attachment comprises essentially two curved members (1) arranged to stiffen substantially the sections of the shoulder straps (T) that lie closest to the upper region of the bag-like body (CS). These members may replace or be associated with said sections of the shoulder straps (T), and consist of a pair of substantially inflexible curved members being each a one-piece construction (2, 2A), or consist of several pieces (6, 11) jointed to one another. In a preferred embodiment, the attachment comprises a pair of members formed each of several pieces (11) which can be associated detachably to the shoulder straps (T), at least one (14) of them in a locked fashion.

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